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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
SEDIGHIAN, REZA	
ART UNIT	**PAPER NUMBER**
2613	

NOTIFICATION DATE	DELIVERY MODE
04/28/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patent-ch@btlaw.com

Office Action Summary	Application No.	Applicant(s)	
	10/780,430	FECED ET AL.	
	Examiner	Art Unit	
	M. R. Sedighian	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7, 10-25* is/are rejected.

7)☒ Claim(s) *8 and 9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. This communication is responsive to applicant's 1/10/08 remarks. Claims 1-25 are now pending.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "a demodulator for demodulating optical orthogonal frequency division multiplexed signals using each of the subcarrier reference signals" and "an electrical demodulation section arranged to carry out a Fast Fourier Transform, and to use the subcarrier reference signals for detection of data in the Fourier transformed signals" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 21-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 21, it is not clear what is meant by "... an encoder for encoding the data values by carrying out a mapping in the complex frequency domain according to corresponding others of the data values," What does it mean by corresponding others of the data values?? It is not clear which data values are the corresponding others of the data values??

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claim 21 is rejected under 35 U.S.C. 102(e) as being anticipated by Mizuochi (US Patent No: 7,110,681 B1).

Regarding claim 21, as it is understood in view of the above 112 problem, Mizuochi discloses an optical transmitter (fig. 2) arranged to transmit an optical orthogonal frequency division multiplexed signal carrying QAM data values (col. 2, lines 28-32, col. 4, lines 44-47, col. 7, lines 15-18), the transmitter having: an encoder (Multi-Level Encoder, fig. 2) for encoding

the data values by carrying out a mapping in a complex frequency domain (col. 4, lines 37-43, col. 7, lines 15-18, and 14, fig. 5) according to corresponding others of the data values (RZ Data(A), RZ Data(B), fig. 5, note that multi-level encoder 14 encodes data values corresponding to other data values, as inputted to RZ encoder 13, and further encodes data value RZ Data(A) in a complex frequency domain according to corresponding other data value RZ Data(B), as it is shown in fig. 5), and a modulator (Optical Modulator, fig. 2) for modulating the encoded data values to form the optical orthogonal frequency division multiplexed signal having a number of frequency channels (col. 4, lines 44-47).

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-7, 11-17, and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Way et al. (US Patent No: 7,003,231 B2) in view of Stuart (US Patent No: 7,218,850 B2).

Regarding claims 1, 11, 15, 17, 23, and 25, Way teaches an optical receiver (40, 44, fig. 1) arranged to receive and demodulate (col. 9, lines 12-24) optical orthogonal frequency division multiplexed signals (col. 8, lines 62-67, col. 9, lines 1-13, col. 10, lines 30-35), and having a subcarrier reference generator (46, fig. 1) arranged to generate a number of subcarrier reference signals, each for use in demodulating a different one of a number of frequency channels of the frequency division multiplexed signals (col. 9, lines 20-24, note that local oscillator 46 is tunable

and can be selectively tuned to one of the channels of the transmitted frequency division multiplexed signal, therefore, it can generate a number of subcarrier reference signals for demodulating a different one of a number of frequency channels of the transmitted frequency division multiplexed signal). Way differs from the claimed invention in that Way does not disclose the subcarrier reference generator is being arranged to compensate for degradations in the generated reference signals by averaging a number of estimates derived from different inputs. Stuart discloses an optical transmission system (fig. 7), wherein a subcarrier reference generator (701, fig. 7) generates a subcarrier reference signal (608a, fig. 7) for demodulating (210, fig. 7) a transmitted frequency channel (col. 6, lines 67), and wherein the subcarrier reference generator (701, 608a, fig. 7) is being arranged to compensate for degradations in the generated reference signals by averaging (609, fig. 7) a number of estimates derived from different inputs (col. 7, lines 1-11, 60-65). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a method of signal demodulation that is comprised of a subcarrier reference generator, a demodulator, and an averaging signal processor, such as the ones of Stuart, for the subcarrier reference generator (or the local oscillator) and demodulation in the heterodyne receiving system of Way, to demodulate the respective channels of the transmitted frequency division multiplexed signal and to further minimize the power present in the noise-channel of the demodulator output (Stuart, col. 7, lines 62-65).

Regarding claims 2 and 24, Stuart discloses the generator being arranged to compensate for phase drift by determining estimates at a number of different frequencies and averaging these estimates (col. 7, lines 1-15, col. 9, lines 20-23, note that a variable phase shifter adapted to

adjust the phase of the local-oscillator signal under control of a signal processor means 609 that determines estimates at a number of different frequencies and averages the estimates).

Regarding claim 3, Stuart discloses the generator being arranged to compensate for noise by determining estimates for a given one of the reference signals at a number of different times and averaging these estimates (col. 7, lines 12-21, 27-29, note that signal processor 609 measures noise power levels and uses the signal power and noise power measurements to optimize the phase shifter 608 to minimize the power present in the noise-channel of the demodulator, therefore, the generator compensates for noise based on estimates from received reference signals and an averaging process of the estimates, provided by the signal processor).

Regarding claims 4 and 12, requires similar limitations, as recited in respective claims 2 and 3 above.

Regarding claims 5, 13, and 16, Way teaches demodulating differentially coded optical orthogonal frequency division multiplexed signals, and being arranged to operate without using a transmitted pilot tone (col. 9, lines 12-13, 20-25, note that demodulation is being arranged without using a transmitted pilot tone).

Regarding claim 6, Way further teaches the optical receiver is arranged to demodulate non differentially coded optical orthogonal frequency division multiplexed signals (col. 9, lines 23-25, col. 10, lines 15-29).

Regarding claim 7, Stuart teaches the generator (701, fig. 7) being arranged to generate the estimated reference signals by stripping detected data from a received signal for each channel (col. 7, lines 52-67).

Regarding claim 14, Stuart teaches a demodulator (210, fig. 7) in the form of a software (col. 6, lines 18-19).

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Way et al. (US Patent No: 7,003,231 B2) in view of Stuart (US Patent No: 7,218,850 B2) and in further view of Kannan et al. (US Patent No: 7,054,375).

Regarding claim 10, Way discloses optical domain receiving section (40, fig. 1), and an electrical demodulation section (44, fig. 1) arranged to use the subcarrier reference signals to detect the transmitted data (col. 9, lines 12-13, 20-24). The signal transmission system of Way modified by Stuart differs from the claimed invention in that Way and Stuart do not disclose the demodulation section is arranged to carry out a Fast Fourier Transform and to use the subcarrier reference signals for detection of data in the Fourier transformed signals. Kannan discloses a demodulator (128, fig. 1) that carry out a Fast Fourier Transform for detection of the transmitted data signals (col. 2, lines 15-25). As it is taught by Kannan, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a demodulator that carry out a Fast Fourier Transform to demodulate the transmitted data, for the demodulation system of Way modified by Stuart to receive and retrieve the transmitted data signals.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atmur et al. (US Patent Application Publication No: 2003/0103771 A1) in view of Way et al. (US Patent No: 7,003,231 B2) and in further view of Maeda et al. (US Patent No: 5,351,148).

Regarding claim 18, Atmur teaches an optical receiver (12, fig. 2) arranged to receive and demodulate (Demodulator, fig. 2) optical signal carrying QAM data values encoded by mapping in a complex frequency domain (page 3, paragraph 0029, 0031) according to corresponding other data value (page 3, paragraph 0029, the other data value such as signal code C(t) generated by PN code generator 22 of the transmitter 10, as it is shown in fig. 1), the receiver having a subcarrier reference generator (Local IF Oscillator, fig. 2) arranged to generate a subcarrier reference signal (page 3, paragraph 0034), a demodulator (Demodulator, fig. 2) for demodulating the received optical signal (page 3, paragraph 0033) using the subcarrier reference signal (Local IF Oscillator, fig. 2), and a decoder (Correlator, fig. 2) for decoding after the demodulation by determining from the corresponding other data values (page 3, paragraphs 0033, 0034 and C(t), fig. 2), an inverse mapping in the complex frequency domain needed to decode the data values (pages 3-4, paragraphs 0034, 0035). Atmur differs from the claimed invention in that Atmur does not specifically disclose the subcarrier reference generator generates a number of subcarrier reference signals, using each for demodulating a respective frequency channel. Way teaches an optical-electrical receiving system to receiver (40, fig. 1) and demodulate (44, fig. 1 and col. 9, lines 12-24) optical orthogonal frequency division multiplexed signals (col. 8, lines 62-67, col. 9, lines 1-13, col. 10, lines 30-35), wherein a subcarrier reference generator (46, fig. 1) is arranged to generate a number of subcarrier reference signals, each for use in demodulating a different one of a number of frequency channels of the frequency division multiplexed signals (col. 9, lines 20-24, note that local oscillator 46 is tunable and can be selectively tuned to one of the channels of the transmitted frequency division multiplexed signal, therefore, it can generate a number of subcarrier reference

signals for demodulating a different one of a number of frequency channels of the transmitted frequency division multiplexed signal). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a subcarrier reference generator that generates different subcarrier reference signals, such as the one of Way, for subcarrier reference generator (the local IF oscillator 44) of Atmur such that different channels can be demodulated and retrieved. The signal transmission and modulation system of Atmur modified by Way further differs from the claimed invention in that Atmur and way do not disclose the receiving signal is an optical orthogonal frequency division multiplexed signal carrying QAM data values. However, a transmitter and a receiver such as the ones of Atmur can be incorporated in a multiplex transmission system to further generate and transmit a plurality of different data signals. For example, Maeda discloses an elctro-optic transmission system for transmitting and receiving optical orthogonal frequency division multiplexed signal carrying QAM data values (col. 6, lines 35-64) by incorporating a signal transmitter (12, fig. 4) with digital signal sources (121, fig. 4), encoders (122, fig. 4), modulators (123, fig. 4), and a receiver (2, fig. 4) with a demodulator (23, fig. 4). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate the transmitter and receiver of Atmur, in a transmitter and a receiver system such as the ones of Maeda, to further generate a frequency division multiplex signal representing the transmission of plurality of different data signal and to further expand the transmission system.

11. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atmur et al. (US Patent Application Publication No: 2003/0103771 A1) in view of Way et al. (US Patent No: 7,003,231 B2) and in view of Maeda et al. (US Patent No: 5,351,148) and in further view of Miyamori et al. (US Patent No: 6,025,946).

Regarding claims 19-20, the modified signal transmission and modulation system of Atmur, Way, and Maeda differs from the claimed invention in that Atmur, Way, and Maeda do not disclose mapping and inverse mapping comprising a rotation of 0, 90, 180, or 270 degrees. Miyamori discloses a demodulator circuit (51, fig. 15) with and inverse mapping (col. 21, lines 45-56) with signal rotation of 0, 90, 180, or 270 degrees to obtain the information (col. 21, lines 57-67). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a method of signal demodulation with inverse mapping and signal rotation, as it is taught by Miyamori, for demodulation of the received data signals in the transmission system of Atmur modified by Way and Maeda, to provide an efficient data demodulation system.

12. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuochi (US Patent No: 7,110,681 B1) in view of Nakamura (US Patent No: 5,168,509).

Regarding claim 22, Mizuochi differs from the claimed invention in that Mizuochi does not disclose mapping comprising a rotation. Nakamura discloses a multi-level QAM communication system with encoding and signal rotation (col. 5, lines 36-43). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a method QAM modulation and signal rotation, as it is taught by Nakamura, for the

QAM data transmission system of Mizuochi to provide a QAM communication system capable of increasing signal transmission reliability (Nakamura, col. 1, lines 8-15).

13. Claims 8-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. Applicant's arguments with respect to claims 1, 11, 15, 17, 18, 21, 23, and 25 have been considered but are moot in view of the new ground(s) of rejection.

Remark states Stuart does not disclose the subcarrier reference generator compensates for degradations in the generated reference signals by averaging a number of estimates derived from different inputs. Stuart discloses a signal processor circuit 609 that is used to control the phase of local oscillator signal 608a (col. 7, lines 60-62), and continuously adjusting the value of the phase shifter 608 using feedback signal 611. Accordingly, Stuart teaches a method of compensating for degradations of the generated reference signals by using signal processor 609 that receives and averages a number of estimates derived from different inputs, and that further controls the phase of local oscillator signal 608a by continuously adjusting the value of phase shifter 608 using the feedback signal 611.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (571) 272-3034. The examiner can normally be reached on 9 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. R. Sedighian/

Primary Examiner, Art Unit 2613